Cross Enterprise Technology Development Program

Surface Systems Thrust Area (PRELIMINARY DRAFT)

Technology Readiness Forecast

Graphic or descriptive text for ENABLED MISSION	Graphic or descriptive text for ENABLED MISSION	Graphic or descriptive text for ENABLED MISSION

PBS Element	Now	5 Yrs	10 Yrs	>15 Yrs
High-Risk Access Robot Mobility & Navigation	Wheeled Rovers 100's Meter Self-Navigation; Local Area Rovers	Multi-Mode Mobility (hop,fly,,etc); >100 km Regional Autonomy	> 1000 km Multi-System Surface Coverage	High-Resolution Global Surface Traverse, Access & In-Situ Probe
Robotic Outposts & Colonies	< 10 Sojourner-Class Rovers Do Local Area Surveys	Low-Cost Robot Teams; Wide Area Measure & Communicate Networks	> 10 Yrs Self-Sustaining Systems; Robotic Repair & Maintenance	Permanent /Perpetual Presence in Deep Space Robotic Infrastructures
Deep Drilling Systems	10's of Samples in Low-Depth Coring Devices (Athena 03,05)	< 10 meter in Mars regolith by percussive robot systems	> 100 m Access to Samples in Mars Regolith	Active Thermal Probe for Icy Planetary Environments
Robotic & Human Cooperation	Rovers Do Full Sample-Acquire Cycle with 1 Ground Command	Collective Autonomy of < 10 Robots Commanded from Earth	Remote Robotic Assistance to Earth-Based Science Analysis	Robot Crews Help Humans in Surface Science Operations
Sample Acquisition & Handling Systems	Small robot arms for surface sampling (e.g. Athena 03, 05)	Automated Extraction of Volatiles (H,C,N,H20) from Mars Regolith	Multi-Site Land, Ascent, & Sampling Robotic Systems (10's of sites)	Comet/Asteroid Anchor, Sample & Retrieve Robotic Systems
In-Situ Resource Utilization Systems	Propulsion Production Experiments (Mars 01)	Micro ISRU System Based on Chemical, Thermal & EM Tech.	ISPP-Fueled Robotic Outpost (Science Station; Rovers; etc.)	ISPP-Fueled Robots for Heavy Duty Surface Science Operations